

## SEQUENCE LISTING

5 <110> Fader, Gary M  
 Famodu, Omolayo O.  
 Huang, Lisa  
 McGonigle, Brian  
 Silva, Alexandre da  
 Tao, Yong  
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60 Leu Thr Glu Glu Gly Ser Phe Asp Glu Ala Ile Lys Gly Cys Thr Gly

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10 Val Ile Gly Pro Phe Leu Leu Pro Thr Ile Pro Ser Ser Val Ile Ser  
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Ala Leu Ser Pro Ile Asn Gly Ile Glu Ala His Tyr Ser Ile Ile Lys  
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30 Lys Tyr Ser Leu Glu Asp Met Tyr Thr Gly Ala Ile Asp Thr Cys Ile  
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agatccggaa gctggggcct gagttcagag gcgtggagga gatgttcgac gactcggttg 960
agtcgctcaa ggcgcattgc tatctgcgcg agggcgccgc gtgatgcgga tgagcggaca 1020
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ttattactaa cacatgagaa gaatgcgttc cctttcttgt ctttatttct gctttgggtg 1140
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cattaaaaaa aaaaaaaaaa aa 1222

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35

&lt;210&gt; 14

&lt;211&gt; 329

&lt;212&gt; PRT

&lt;213&gt; Triticum aestivum

40

&lt;400&gt; 14

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Met Ala Asn Thr Ser Lys Gly Lys Val Cys Val Thr Gly Ala Ser Gly
  1             5             10             15

```

45

```

Phe Val Ala Ser Trp Leu Val Lys Arg Leu Leu Glu Ser Gly Tyr His
          20             25             30

```

```

Val Leu Gly Thr Val Arg Asp Pro Gly Asn Gln Lys Lys Val Ala His
          35             40             45

```

50

```

Leu Trp Asn Leu Ala Gly Ala Lys Glu Gly Leu Glu Leu Val Arg Ala
          50             55             60

```

```

Asp Leu Leu Glu Glu Gly Ser Phe Asp Asp Ala Val Met Ala Cys Glu
          65             70             75             80

```

55

```

Gly Val Phe His Thr Ala Ser Pro Ile Ile Thr Asn Ala Asp Ser Lys
          85             90             95

```

60

```

Glu Glu Met Leu Asp Ser Ala Ile Asn Gly Thr Leu Asn Val Leu Arg
          100            105            110

```

Ser Cys Lys Lys Asn Pro Phe Leu Lys Arg Val Val Leu Thr Ser Ser  
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 5 Ser Ser Thr Met Arg Leu Arg Asp Glu Ala Glu Phe Pro Pro Asn Val  
 130 135 140  
 Leu Leu Asp Glu Thr Ser Trp Ser Ser Val Glu Phe Cys Glu Ser Ile  
 145 150 155 160  
 10 Gln Ile Trp Tyr Ala Val Ala Lys Ile Leu Ala Glu Lys Ser Ala Trp  
 165 170 175  
 Glu Phe Ala Lys Glu Asn Asn Ile Asp Leu Val Ala Val Leu Pro Thr  
 180 185 190  
 15 Phe Ile Ile Gly Pro Asn Leu Ser Pro Val Leu Gly Pro Thr Ala Ser  
 195 200 205  
 20 Asp Val Leu Gly Leu Phe Lys Gly Glu Thr Glu Lys Phe Thr Ile Phe  
 210 215 220  
 Gly Arg Met Gly Tyr Val His Ile Asp Asp Val Ala Ser Cys His Ile  
 225 230 235 240  
 25 Leu Val Tyr Glu Thr Ala Asp Ala Lys Gly Arg Tyr Ile Cys Asn Ser  
 245 250 255  
 30 Ala Val Leu Asp Ser Asn Glu Leu Val Ala Leu Leu Ala Lys Arg Phe  
 260 265 270  
 Pro Ser Phe Pro Ile Pro Lys Ser Leu Pro Asn Ile Tyr Gly Glu Gln  
 275 280 285  
 35 Thr Tyr Gly Tyr Asn Thr Ser Lys Ile Arg Lys Leu Gly Leu Glu Phe  
 290 295 300  
 Arg Gly Val Glu Glu Met Phe Asp Asp Ser Val Glu Ser Leu Lys Ala  
 305 310 315 320  
 40 His Gly Tyr Leu Arg Glu Gly Ala Ala  
 325  
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 caatggacgg gagcaaaggg cgggtggtgg tgactggagc gtcgggtttc gtaggggtcgt 120  
 ggctcgtcat gaagctcctc caggccgggt acaccgtccg ggccaccgtg cgcgaccgg 180  
 ccaacgttga gaagaacaag ccgttgctgg agcttcccg agccaaggag cggctgtcca 240  
 55 tctggaaggc cgacctgagc gacgaaggca gcttcgacga cgccatcgcc ggctgcaccg 300  
 gcgtcttcca cgtcgccacg cccatggact tcgactccaa agatcccag aacgaggtga 360  
 tcaaaccac ggtggaaggg atgctgagca tcatgagggc ctgcaaggag gctggcaccg 420  
 tgaagcgcat cgtcttcacc tcctccgccg gcagcgtcaa catcgaggag cggcagcggc 480  
 cagcctacga ccaggacaac tggagcgaca tcgacttctg ccgccgcgtc aagatgacag 540  
 60 gatggatgta ctctgtgtcc aagtcctctg cagagaaggc cgccatggag tacgccagcg 600

agaacggcct ggacttcac agcatcatcc ccacgctcgt agtcggcccg ttcctcagcg 660  
 ccggcatgcc gccagcctc gtcaccgccc tggcgctcat cacagggaaat gaagcccact 720  
 actcgatcct gaagcagggtg cagctgggtgc acctggacga cctctgcgac gccatgacct 780  
 5 tctctttcga gcaccggag gccaacggcc gctacatctg ctctctccac gacgccacca 840  
 tccacggcct cgccaggatg ctccgggaca gggtcccgga gtacagcatc cgcacaagt 900  
 tcgcaggcgt cgacgacgac ctccagccca tccacttctc ctccaagaag ctctcgacc 960  
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 gggagaagg cctcattccg ctccgagacg ccccgggcgc tgcatgtgcc ggcaagctgg 1080  
 gagctcttgc tgcgggcaaa ggccaagcca ttggtgccga gacataataa gccagcgctg 1140  
 10 ctgcatgaat actattcttg tgttcggaat ttgcatgggc agagccctgt aactagtggg 1200  
 atatcatgga ctatggagtg catcaaattt ttttcacctc gccagtagta tgaaataaaa 1260  
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<212> PRT

<213> Triticum aestivum

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Arg Ala Thr Val Arg Asp Pro Ala Asn Val Glu Lys Asn Lys Pro Leu  
 35 40 45

Leu Glu Leu Pro Gly Ala Lys Glu Arg Leu Ser Ile Trp Lys Ala Asp  
 50 55 60

Leu Ser Asp Glu Gly Ser Phe Asp Asp Ala Ile Ala Gly Cys Thr Gly  
 65 70 75 80

Val Phe His Val Ala Thr Pro Met Asp Phe Asp Ser Lys Asp Pro Glu  
 85 90 95

Asn Glu Val Ile Lys Pro Thr Val Glu Gly Met Leu Ser Ile Met Arg  
 100 105 110

Ala Cys Lys Glu Ala Gly Thr Val Lys Arg Ile Val Phe Thr Ser Ser  
 115 120 125

Ala Gly Ser Val Asn Ile Glu Glu Arg Gln Arg Pro Ala Tyr Asp Gln  
 130 135 140

Asp Asn Trp Ser Asp Ile Asp Phe Cys Arg Arg Val Lys Met Thr Gly  
 145 150 155 160

Trp Met Tyr Phe Val Ser Lys Ser Leu Ala Glu Lys Ala Ala Met Glu  
 165 170 175

Tyr Ala Ser Glu Asn Gly Leu Asp Phe Ile Ser Ile Ile Pro Thr Leu  
 180 185 190

Val Val Gly Pro Phe Leu Ser Ala Gly Met Pro Pro Ser Leu Val Thr  
 195 200 205

Ala Leu Ala Leu Ile Thr Gly Asn Glu Ala His Tyr Ser Ile Leu Lys  
 210 215 220  
 5 Gln Val Gln Leu Val His Leu Asp Asp Leu Cys Asp Ala Met Thr Phe  
 225 230 235 240  
 Leu Phe Glu His Pro Glu Ala Asn Gly Arg Tyr Ile Cys Ser Ser His  
 245 250 255  
 10 Asp Ala Thr Ile His Gly Leu Ala Arg Met Leu Arg Asp Arg Phe Pro  
 260 265 270  
 Glu Tyr Ser Ile Pro His Lys Phe Ala Gly Val Asp Asp Asp Leu Gln  
 275 280 285  
 15 Pro Ile His Phe Ser Ser Lys Lys Leu Leu Asp His Gly Phe Ser Phe  
 290 295 300  
 20 Arg Tyr Thr Ala Glu Asp Met Phe Asp Ala Ala Ile Arg Thr Cys Arg  
 305 310 315 320  
 Glu Lys Gly Leu Ile Pro Leu Gly Asp Ala Pro Ala Pro Ala Ala Ala  
 325 330 335  
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 35 40 45  
 Val Glu Leu Pro Gly Ala Lys Ser Lys Leu Ser Leu Trp Lys Ala Asp  
 50 55 60  
 50 Leu Ala Glu Glu Gly Ser Phe Asp Glu Ala Ile Lys Gly Cys Thr Gly  
 65 70 75 80  
 Val Phe His Val Ala Thr Pro Met Asp Phe Glu Ser Lys Asp Pro Glu  
 85 90 95  
 55 Asn Glu Val Ile Lys Pro Thr Ile Asn Gly Val Leu Asp Ile Met Lys  
 100 105 110  
 60 Ala Cys Leu Lys Ala Lys Thr Val Arg Arg Leu Ile Phe Thr Ser Ser  
 115 120 125

Ala Gly Thr Leu Asn Val Ile Glu Arg Gln Lys Pro Val Phe Asp Asp  
 130 135 140  
 5 Thr Cys Trp Ser Asp Val Glu Phe Cys Arg Arg Val Lys Met Thr Gly  
 145 150 155 160  
 Trp Met Tyr Phe Val Ser Lys Thr Leu Ala Glu Lys Glu Ala Trp Lys  
 165 170 175  
 10 Phe Ala Lys Glu Gln Gly Leu Asp Phe Ile Thr Ile Ile Pro Pro Leu  
 180 185 190  
 Val Val Gly Pro Phe Leu Met Pro Thr Met Pro Pro Ser Leu Ile Thr  
 195 200 205  
 15 Ala Leu Ser Pro Ile Thr Gly Asn Glu Asp His Tyr Ser Ile Ile Lys  
 210 215 220  
 20 Gln Gly Gln Phe Val His Leu Asp Asp Leu Cys Leu Ala His Ile Phe  
 225 230 235 240  
 Leu Phe Glu Glu Pro Glu Val Glu Gly Arg Tyr Ile Cys Ser Ala Cys  
 245 250 255  
 25 Asp Ala Thr Ile His Asp Ile Ala Lys Leu Ile Asn Gln Lys Tyr Pro  
 260 265 270  
 30 Glu Tyr Lys Val Pro Thr Lys Phe Lys Asn Ile Pro Asp Gln Leu Glu  
 275 280 285  
 Leu Val Arg Phe Ser Ser Lys Lys Ile Thr Asp Leu Gly Phe Lys Phe  
 290 295 300  
 35 Lys Tyr Ser Leu Glu Asp Met Tyr Thr Gly Ala Ile Asp Thr Cys Arg  
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 Asp Lys Gly Leu Leu Pro Lys Pro Ala Glu Lys Gly Leu Phe Thr Lys  
 325 330 335  
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 55 Ser Gly Tyr Lys Val Asn Thr Thr Val Arg Asp Pro Glu Asn Glu Lys  
 35 40 45  
 60 Lys Ile Ala His Leu Arg Gln Leu Gln Glu Leu Gly Asp Leu Lys Ile

50                      55                      60  
 Phe Lys Ala Asp Leu Thr Asp Glu Asp Ser Phe Glu Ser Ser Phe Ser  
 65                      70                      75                      80  
 5 Gly Cys Glu Tyr Ile Phe His Val Ala Thr Pro Ile Asn Phe Lys Ser  
                                  85                      90                      95  
 10 Glu Asp Pro Glu Lys Asp Met Ile Lys Pro Ala Ile Gln Gly Val Ile  
                                  100                      105                      110  
 Asn Val Leu Lys Ser Cys Leu Lys Ser Lys Ser Val Lys Arg Val Ile  
                                  115                      120                      125  
 15 Tyr Thr Ser Ser Ala Ala Ala Val Ser Ile Asn Asn Leu Ser Gly Thr  
                                  130                      135                      140  
 Gly Leu Val Met Asn Glu Glu Asn Trp Thr Asp Ile Asp Phe Leu Thr  
 20 145                      150                      155                      160  
 Glu Glu Lys Pro Phe Asn Trp Gly Tyr Pro Ile Ser Lys Val Leu Ala  
                                  165                      170                      175  
 25 Glu Lys Lys Ala Trp Glu Phe Ala Glu Glu Asn Lys Ile Asn Leu Val  
                                  180                      185                      190  
 Thr Val Ile Pro Ala Leu Ile Ala Gly Asn Ser Leu Leu Ser Asp Pro  
                                  195                      200                      205  
 30 Pro Ser Ser Leu Ser Leu Ser Met Ser Phe Ile Thr Gly Lys Glu Met  
                                  210                      215                      220  
 His Val Thr Gly Leu Lys Glu Met Gln Lys Leu Ser Gly Ser Ile Ser  
 35 225                      230                      235                      240  
 Phe Val His Val Asp Asp Leu Ala Arg Ala His Leu Phe Leu Ala Glu  
                                  245                      250                      255  
 40 Lys Glu Thr Ala Ser Gly Arg Tyr Ile Cys Cys Ala Tyr Asn Thr Ser  
                                  260                      265                      270  
 Val Pro Glu Ile Ala Asp Phe Leu Ile Gln Arg Tyr Pro Lys Tyr Asn  
                                  275                      280                      285  
 45 Val Leu Ser Glu Phe Glu Glu Gly Leu Ser Ile Pro Lys Leu Thr Leu  
                                  290                      295                      300  
 Ser Ser Gln Lys Leu Ile Asn Glu Gly Phe Arg Phe Glu Tyr Gly Ile  
 50 305                      310                      315                      320  
 Asn Glu Met Tyr Asp Gln Met Ile Glu Tyr Phe Glu Ser Lys Gly Leu  
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 55 Ile Lys Ala Lys Glu Ser  
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&lt;211&gt; 354

60 &lt;212&gt; PRT

&lt;213&gt; Hordeum vulgare

&lt;400&gt; 19

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 10 Arg Ala Thr Val Arg Asp Pro Ala Asn Val Glu Lys Thr Lys Pro Leu  
 35 40 45  
 Leu Glu Leu Pro Gly Ala Lys Glu Arg Leu Ser Ile Trp Lys Ala Asp  
 50 55 60  
 15 Leu Ser Glu Asp Gly Ser Phe Asn Glu Ala Ile Ala Gly Cys Thr Gly  
 65 70 75 80  
 Val Phe His Val Ala Thr Pro Met Asp Phe Asp Ser Gln Asp Pro Glu  
 85 90 95  
 20 Asn Glu Val Ile Lys Pro Thr Val Glu Gly Met Leu Ser Ile Met Arg  
 100 105 110  
 25 Ala Cys Lys Glu Ala Gly Thr Val Lys Arg Ile Val Phe Thr Ser Ser  
 115 120 125  
 Ala Gly Ser Val Asn Ile Glu Glu Arg Pro Arg Pro Ala Tyr Asp Gln  
 130 135 140  
 30 Asp Asn Trp Ser Asp Ile Asp Tyr Cys Arg Arg Val Lys Met Thr Gly  
 145 150 155 160  
 Trp Met Tyr Phe Val Ser Lys Ala Leu Ala Glu Lys Ala Ala Met Glu  
 165 170 175  
 35 Tyr Ala Ser Glu Asn Gly Leu Asp Phe Ile Ser Ile Ile Pro Thr Leu  
 180 185 190  
 40 Val Val Gly Pro Phe Leu Ser Ala Gly Met Pro Pro Ser Leu Val Thr  
 195 200 205  
 Ala Leu Ala Leu Ile Thr Gly Asn Glu Ala His Tyr Ser Ile Leu Lys  
 210 215 220  
 45 Gln Val Gln Leu Val His Leu Asp Asp Leu Cys Asp Ala Met Thr Phe  
 225 230 235 240  
 Leu Phe Glu His Pro Glu Ala Asn Gly Arg Tyr Ile Cys Ser Ser His  
 245 250 255  
 50 Asp Ala Thr Ile His Gly Leu Ala Arg Met Leu Gln Asp Arg Phe Pro  
 260 265 270  
 55 Glu Tyr Asp Ile Pro Gln Lys Phe Ala Gly Val Asp Asp Asn Leu Gln  
 275 280 285  
 Pro Ile His Phe Ser Ser Lys Lys Leu Leu Asp His Gly Phe Ser Phe  
 290 295 300  
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Arg Tyr Thr Thr Glu Asp Met Phe Asp Ala Ala Ile His Thr Cys Arg  
 305 310 315 320  
 5 Asp Lys Gly Leu Ile Pro Leu Gly Asp Val Pro Ala Pro Ala Ala Gly  
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 Gly Lys Leu Gly Ala Leu Ala Ala Gly Glu Gly Gln Ala Ile Gly Ala  
 340 345 350  
 10 Glu Thr  
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 15 <211> 330  
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 25 Val Ile Gly Thr Val Arg Asp Pro Ser Asn Arg Glu Lys Val Ser His  
 35 40 45  
 Leu Trp Arg Leu Pro Ser Ala Lys Glu Arg Leu Gln Leu Val Arg Ala  
 50 55 60  
 Asp Leu Met Glu Glu Gly Ser Phe Asp Asp Ala Val Met Ala Cys Glu  
 65 70 75 80  
 35 Gly Val Phe His Thr Ala Ser Pro Val Leu Ala Lys Ser Asp Ser Asn  
 85 90 95  
 Cys Lys Glu Glu Met Leu Val Pro Ala Ile Asn Gly Thr Leu Asn Val  
 100 105 110  
 40 Leu Lys Ser Cys Lys Lys Asn Pro Phe Leu Lys Arg Val Val Leu Thr  
 115 120 125  
 Ser Ser Ser Ser Thr Val Arg Ile Met Asp Glu Ser Lys His Pro Glu  
 130 135 140  
 45 Ile Ser Leu Asp Glu Thr Ile Trp Ser Ser Val Ala Leu Cys Glu Lys  
 145 150 155 160  
 50 Leu Gln Leu Trp Tyr Ala Leu Ala Lys Ile Ser Ala Glu Lys Ala Ala  
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 Trp Glu Phe Ala Lys Glu Asn Asn Ile Asp Leu Val Thr Val Leu Pro  
 180 185 190  
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 195 200 205  
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Tyr Gly Arg Met Gly Tyr Val His Ile Asp Asp Val Ala Ser Cys His  
 225 230 235 240  
 5 Ile Leu Val Tyr Glu Ala Pro Gln Ala Thr Gly Arg Tyr Leu Cys Asn  
 245 250 255  
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 260 265 270  
 10 Phe Pro Ile Phe Pro Ile Pro Arg Ser Leu Arg Asn Pro Tyr Glu Lys  
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 35 40 45  
 40 His Leu Leu Glu Leu Pro Gln Ala Ala Thr Arg Leu Thr Leu Trp Lys  
 50 55 60  
 Ala Asp Leu Asp Val Glu Gly Ser Phe Asp Glu Ala Ile Lys Gly Cys  
 65 70 75 80  
 45 Thr Gly Val Phe His Val Ala Thr Pro Met Asp Phe Glu Ser Glu Asp  
 85 90 95  
 Pro Glu Asn Glu Val Ile Lys Pro Thr Ile Asn Gly Met Leu Asp Ile  
 100 105 110  
 Met Lys Ala Cys Leu Lys Ala Lys Thr Val Arg Arg Leu Val Phe Thr  
 115 120 125  
 55 Ser Ser Ala Gly Ala Val Ala Ile Glu Glu His Pro Lys Glu Val Tyr  
 130 135 140  
 Ser Glu Asn Asn Trp Ser Asp Val Val Phe Cys Arg Lys Val Lys Met  
 145 150 155 160  
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Thr Gly Trp Met Tyr Phe Val Ser Lys Thr Leu Ala Glu Gln Ala Ala  
 165 170 175  
 5 Trp Lys Phe Ala Lys Glu Asn Asn Ile Asp Phe Ile Thr Ile Ile Pro  
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 Thr Leu Val Ile Gly Pro Phe Leu Ala Pro Ser Met Pro Pro Ser Leu  
 195 200 205  
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 210 215 220  
 Ile Lys Gln Cys Gln Tyr Val His Leu Asp Asp Leu Cys Gln Ser His  
 225 230 235 240  
 15 Ile Phe Leu Tyr Glu His Ala Lys Ala Glu Gly Arg Tyr Ile Cys Ser  
 245 250 255  
 20 Ser His Asp Ala Thr Ile His Asp Ile Ala Lys Leu Leu Asn Glu Lys  
 260 265 270  
 Tyr Pro Lys Tyr Asn Val Pro Lys Lys Phe Lys Gly Ile Glu Glu Asn  
 275 280 285  
 25 Leu Thr Asn Ile His Phe Ser Ser Lys Lys Leu Lys Glu Met Gly Phe  
 290 295 300  
 Glu Phe Lys His Ser Leu Glu Asp Met Phe Thr Gly Ala Val Asp Ala  
 305 310 315 320  
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 325 330 335  
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 20 25 30  
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 35 40 45  
 55 Leu Trp Lys Leu Pro Gly Ala Lys Glu Arg Leu Gln Ile Val Arg Ala  
 50 55 60  
 Asn Leu Leu Glu Glu Gly Ser Phe Asp Ser Ala Val Met Ala Cys Glu  
 65 70 75 80  
 60 Gly Val Phe His Thr Ala Ser Pro Val Leu Ala Lys Pro Asp Ser Thr

	85	90	95
	Ser Lys Glu Asp Thr Leu Val Pro Ala Val Asn Gly Thr Leu Asn Val		
	100	105	110
5	Leu Arg Ser Cys Lys Lys Asn Pro Phe Leu Lys Arg Val Val Leu Thr		
	115	120	125
10	Ser Ser Ser Ser Ala Val Arg Ile Arg Asp Asp Gly Gly Gln Ser Ser		
	130	135	140
	Asn Ile Ser Leu Asp Glu Thr Thr Trp Ser Ser Val Pro Leu Cys Glu		
	145	150	155
15	Lys Met His Leu Trp Tyr Ala Leu Ala Lys Val Phe Ala Glu Lys Ala		
	165	170	175
	Ala Trp Glu Phe Ala Lys Glu Asn Gly Ile Asp Leu Val Thr Val Leu		
	180	185	190
20	Pro Ser Phe Val Ile Gly Pro Ser Leu Ser His Glu Leu Cys Val Thr		
	195	200	205
25	Ala Ser Asp Val Leu Gly Leu Phe Gln Gly Asp Thr Ala Arg Phe Ser		
	210	215	220
	Ser Tyr Gly Arg Met Gly Tyr Val His Ile Asp Asp Val Ala Ser Ser		
	225	230	235
30	His Ile Leu Val Tyr Glu Val Pro Gln Ala Ala Gly Arg Tyr Leu Cys		
	245	250	255
	Ser Ser Val Val Leu Asp Asn Asp Glu Leu Val Ser Ser Leu Ala Lys		
	260	265	270
35	Arg Tyr Pro Ile Phe Pro Ile Pro Arg Arg Leu Asn Ser Pro Tyr Gly		
	275	280	285
40	Lys Gln Ser Tyr Gln Leu Asn Thr Ser Lys Leu Gln Gly Leu Gly Phe		
	290	295	300
	Lys Phe Arg Gly Val Gln Glu Met Phe Asp Asp Cys Val Gln Ser Leu		
	305	310	315
45	Lys Asp Gln Gly His Leu Leu Glu Cys Pro Leu		
	325	330	

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